CLAIMS

1. A communication station for receiving a desired signal via an antenna disposable at a skew angle to receive the desired signal, the communication station comprising:

a control unit comprising:

a memory containing data structures comprising a tuning module configured to determine a first vector corresponding to communication of the antenna with a first transmitter and a second vector corresponding to communication of the antenna with a second transmitter; and

a motor controller electrically coupled to the memory to trigger orientation of the antenna to permit communication with the first and second transmitters via the first and second vectors to facilitate determination of the skew angle.

2. The communication station of claim 1, further comprising the antenna.

3. The communication station of claim 2, wherein the control unit further comprises a motor assembly controllable by the motor controller to pivot the antenna about an elevation axis and an azimuth axis to orient the antenna to communicate with the first transmitter, wherein the motor assembly is further configured to pivot the antenna about a skew axis to align the antenna with the skew angle.

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4. The communication station of claim 2, wherein the antenna is shaped to reflect a first signal from the first transmitter, the communication station further comprising a first LNB disposed to receive the first signal after reflection from the antenna.

5. The communication station of claim 4, wherein the data structures further comprise a vector manipulation module configured to mathematically process the first and second vectors to obtain a third vector extending between the first and second transmitters, wherein the skew angle is derived from the third vector.

6. The communication station of claim 5, wherein the desired signal is to be received from the first transmitter, the first transmitter comprising a first dish, wherein the data structures further comprise an arc adjustment module configured to offset the third vector to provide the skew angle such that, when the antenna is disposed at the skew angle, the antenna is substantially parallel to the first dish.

7. The communication station of claim 4, further comprising a second LNB disposed to receive a second signal from the second transmitter after reflection of the second signal from the antenna, wherein the first and second LNB's are relatively disposed such that the antenna is able to simultaneously receive the first and second signals via the first and second LNB's, respectively.

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8. The communication station of claim 7, wherein the tuning module is configured to communicate with the motor controller to pivot the antenna about the elevation and azimuth axes to obtain the first vector, and then exclusively about the skew axis to simultaneously obtain the second vector and dispose the antenna at the skew angle.

9. The communication station of claim 1, further comprising a sensor array coupled to the antenna to provide location and orientation data to the control unit.

10. The communication station of claim 9, wherein the data structures further comprise a window acquisition module configured to receive the location and orientation data and to utilize the location and orientation data to obtain a first window, within which the first vector is disposed, and a second window, within which the second vector is disposed.

11. The communication station of claim 10, wherein the tuning module receives the first and second windows and initiates motion of the antenna to receive a first signal and a second signal from within the first and second windows, respectively, wherein the tuning module receives signal strength data from within the first and second windows to find vectors along which signal strength is maximized within the first and second windows, thereby determining the first and second vectors, respectively.

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12. The communication station of claim 9, wherein the sensor array comprises a global positioning satellite (GPS) receiver, a level, a tilt indicator, and a compass, the communication station further comprising a first LNB configured to receive the desired signal and convert the desired signal into an analog signal, a splitter configured to convey the analog signal to the control unit and to a modem configured to convert the analog signal to a digital signal, and a computer coupled to the modem to receive the digital signal.

13. The communication station of claim 1, wherein the first transmitter comprises a first satellite and the second transmitter comprises a second satellite, wherein the first satellite comprises a first dish oriented substantially perpendicular to the first vector and the second satellite comprises a second dish oriented substantially perpendicular to the second vector, wherein the tuning module is configured to orient the antenna substantially parallel to the first dish to enable communication of the antenna with the first satellite and to orient the antenna substantially parallel to the second dish to enable communication of the antenna with the second satellite.

14. The communication station of claim 13, wherein the second satellite is displaced from the first satellite by at least fifteen degrees with respect to the antenna.

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15. A communication station for receiving a desired signal via an antenna disposable at a skew angle to receive the desired signal, the communication station comprising:

a control unit comprising:

a memory containing data structures comprising:

a tuning module configured to determine a first vector corresponding to communication of the antenna with a first transmitter and a second vector corresponding to communication of the antenna with a second transmitter; and

a vector manipulation module configured to process the first and second vectors to determine the skew angle.

16. The communication station of claim 15, wherein the first transmitter comprises a first satellite and the second transmitter comprises a second satellite, wherein the first satellite comprises a first dish and the second satellite comprises a second dish, wherein the control unit further comprises a motor controller electrically coupled to the memory to trigger orientation of the antenna substantially parallel to the first dish to permit communication of the antenna with the first satellite and to trigger orientation of the antenna substantially parallel to the second dish to permit communication of the antenna with the second satellite.

17. The communication station of claim 16, wherein the vector manipulation module is configured to determine a third vector extending between the first and second satellites.

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18. The communication station of claim 17, wherein the desired signal is to be received from the first satellite, the data structures further comprising an arc adjustment module configured to offset the third vector to provide the skew angle such that, when the antenna is disposed at the skew angle, the antenna is substantially parallel to the first dish.

19. The communication station of claim 17, wherein the desired signal is to be received from a third satellite disposed generally midway between the first and second satellites such that the third vector provides the skew angle substantially without adjustment.

20. The communication station of claim 15, further comprising the antenna, a sensor array coupled to the antenna to provide location and orientation data to the control unit, and a motor assembly controllable by the motor controller to pivot the antenna about an elevation axis, an azimuth axis, and a skew axis.

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21. The communication station of claim 20, wherein the data structures further comprise a window acquisition module configured to receive the location and orientation data and to utilize the location and orientation data to obtain a first window, within which the first vector is disposed, and a second window, within which the second vector is disposed, wherein the tuning module receives the first and second windows and initiates motion of the antenna to receive a first and second signals from within the first and second windows, respectively, wherein the tuning module receives signal strength data from within the first and second windows to find vectors along which the signal strength is maximized within the first and second windows, thereby determining the first and second vectors, respectively.

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22. A cross polarization system for facilitating receipt of a desired signal by an antenna, the cross polarization system comprising:

a window acquisition module configured to establish a first window and a second window, with respect to the antenna; and

a tuning module configured to determine a first vector within the first window, the first vector corresponding to communication of the antenna with a first transmitter, and a second vector within the second window, the second vector corresponding to communication of the antenna with a second transmitter, to facilitate determination of a skew angle at which the antenna is disposable to cross polarize the antenna with respect to the desired signal

23. The cross polarization system of claim 22, wherein the tuning module receives the first and second windows and initiates motion of the antenna to receive signals from within the first and second windows, wherein the tuning module receives signal strength data from within the first and second windows to find vectors along which the signal strength is maximized within the first and second windows, thereby determining the first and second vectors, respectively.

24. The cross polarization system of claim 23, further comprising a vector manipulation module configured to mathematically process the first and second vectors to obtain a third vector extending between the first and second transmitters, wherein the skew angle is derived from the third vector.

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25. The cross polarization system of claim 23, wherein the tuning module is configured to communicate with the motor controller to pivot the antenna about the elevation and azimuth axes to obtain the first vector, and then exclusively about the skew axis to simultaneously obtain the second vector and dispose the antenna at the skew angle.

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26. A method for receiving a desired signal via an antenna, the method comprising:

aligning the antenna to receive a first signal from a first transmitter;

aligning the antenna to receive a second signal from a second transmitter; and

receiving the desired signal with the antenna disposed at a skew angle obtained via alignment of the antenna with the first and second transmitters.

27. The method of claim 26, wherein aligning the antenna to receive the first signal comprises pivoting the antenna about an elevation axis and an azimuth axis to orient the antenna to communicate with the first transmitter, the method further comprising pivoting the antenna about a skew axis to dispose the antenna at the skew angle prior to reception of the desired signal with the antenna disposed at the skew angle.

28. The method of claim 26, wherein the antenna is shaped to reflect the first signal from the first transmitter, wherein aligning the antenna to receive the first signal comprises receiving the first signal with a first LNB after reflection of the first signal from the antenna.

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29. The method of claim 28, further comprising:

obtaining a first vector corresponding to communication of the antenna with the first transmitter;

obtaining a second vector corresponding to communication of the antenna with the second transmitter;

mathematically processing the first and second vectors to obtain a third vector extending between the first and second transmitters; and

deriving the skew angle from the third vector.

30. The method of claim 29, wherein the desired signal is to be received from the first transmitter, the first transmitter comprising a first dish, the method further comprising offsetting the third vector to provide the skew angle such that, when the antenna is disposed at the skew angle, the antenna is substantially parallel to the first dish.

31. The method of claim 28, wherein aligning the antenna to receive the second signal comprises receiving the second signal with a second LNB after reflection of the second signal from the antenna, wherein the first and second LNB's are relatively disposed such that the antenna is able to simultaneously receive the first and second signals via the first and second LNB's, respectively.

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32. The method of claim 31, wherein aligning the antenna to receive the first signal comprises pivoting the antenna about the elevation and azimuth axes to obtain the first vector, wherein aligning the antenna to receive the second signal comprises pivoting the antenna exclusively about the skew axis to simultaneously obtain the second vector and dispose the antenna at the skew angle.

33. The method of claim 26, wherein aligning the antenna to receive the first signal comprises receiving location and orientation data from a sensor array coupled to the antenna and utilizing the location and orientation data to obtain a first window, within which the first vector is disposed, and wherein aligning the antenna to receive the second signal comprises utilizing the location and orientation data to obtain a second window, within which the second vector is disposed.

34. The method of claim 33, wherein aligning the antenna to receive the first signal comprises moving the antenna to receive the first signal from within the first window, and receiving signal strength data from within the first window to find a vector within the first window along which signal strength is maximized, thereby determining the first vector, wherein aligning the antenna to receive the second signal comprises moving the antenna to receive the second signal from within the second window and receiving signal strength data from within the second window to find a vector within the second window along which signal strength is maximized, thereby determining the second vector.

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35. The method of claim 26, wherein the first transmitter comprises a first satellite comprising a first dish and the second transmitter comprises a second satellite comprising a second dish, wherein aligning the antenna to receive the first signal comprises orienting the antenna substantially parallel to the first dish to enable communication of the antenna with the first satellite, wherein aligning the antenna to receive the second signal comprises orienting the antenna substantially parallel to the second dish to enable communication of the antenna with the second satellite.

36. The method of claim 35, wherein the second satellite is displaced from the first satellite by at least fifteen degrees with respect to the antenna.

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37. A method for cross polarizing a desired signal with an antenna, the method comprising:

determining a first vector corresponding to communication of the antenna with a first transmitter;

determining a second vector corresponding to communication of the antenna with a second transmitter; and

obtaining a skew angle for the antenna based on the first and second vectors.

38. The method of claim 37, wherein the first transmitter comprises a first satellite comprising a first dish and the second transmitter comprises a second satellite comprising a second dish, wherein determining the first vector comprises orienting the antenna substantially parallel to the first dish to permit communication of the antenna with the first satellite, wherein determining the second vector comprises orienting the antenna substantially parallel to the second dish to permit communication of the antenna with the second satellite.

39. The method of claim 38, wherein obtaining the skew angle for the antenna comprises determining a third vector extending between the first and second satellites.

40. The method of claim 39, wherein the desired signal is to be received from the first satellite, wherein obtaining the skew angle for the antenna comprises offsetting the third vector to provide the skew angle such that, when the antenna is disposed at the skew angle, the antenna is substantially parallel to the first dish.

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41. The method of claim 39, wherein the desired signal is to be received from a third satellite disposed generally midway between the first and second satellites such that the third vector provides the skew angle substantially without adjustment.

42. The method of claim 37, further comprising:

receiving location and orientation data from a sensor array coupled to the antenna; and

utilizing the location and orientation data to obtain a first window, within which the first vector is disposed, and a second window, within which the second vector is disposed;

wherein determining the first vector comprises receiving the first window, moving the antenna to receive a first signal from within the first window, and receiving signal strength data from within the first window to find a vector along which signal strength is maximized within the first window to determine the first vector;

wherein determining the second vector comprises receiving the second window, moving the antenna to receive a second signal from within the second window, and receiving signal strength data from within the second window to find a vector along which signal strength is maximized within the second window to determine the second vector.

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43. A method for cross polarizing a desired signal with an antenna, the method comprising:

establishing a first window with respect to the antenna;

determining a first vector within the first window, the first vector corresponding to communication of the antenna with a first transmitter;

establishing a second window with respect to the antenna; and

determining a second vector within the second window, the second vector corresponding to communication of the antenna with a second transmitter, to obtain a skew angle at which the antenna is disposable to cross polarize the antenna with respect to the desired signal.

44. The method of claim 43, wherein determining the first vector comprises receiving the first window, initiating motion of the antenna to receive a first signal from within the first window, and receiving signal strength data from within the first window to find a vector along which the signal strength is maximized within the first window, wherein determining the second vector comprises receiving the second window, initiating motion of the antenna to receive the second signal from within the second window, and receiving signal strength data from within the second window

45. The method of claim 44, further comprising:

mathematically processing the first and second vectors to obtain a third vector extending between the first and second transmitters; and

deriving the skew angle from the third vector.

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46. The method of claim 44, wherein determining the first vector comprises pivoting the antenna about elevation and azimuth axes to obtain the first vector, wherein determining the second vector comprises pivoting the antenna exclusively about a skew axis to simultaneously obtain the second vector and dispose the antenna at the skew angle.

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47. A computer readable medium comprising computer code for facilitating receipt of a desired signal by an antenna, wherein the computer code is configured to carry out a method comprising:

initiating alignment of the antenna to receive a first signal from a first transmitter;

initiating alignment of the antenna to receive a second signal from a second transmitter; and

receiving the desired signal with the antenna disposed at a skew angle obtained via alignment of the antenna with the first and second transmitters.

48. The computer readable medium of claim 47, wherein the antenna is shaped to reflect the first signal from the first transmitter, wherein aligning the antenna to receive the first signal comprises receiving the first signal with a first LNB after reflection of the first signal from the antenna.

49. The computer readable medium of claim 48, further comprising:

obtaining a first vector corresponding to communication of the antenna with the first transmitter;

obtaining a second vector corresponding to communication of the antenna with the second transmitter;

mathematically processing the first and second vectors to obtain a third vector extending between the first and second transmitters; and

deriving the skew angle from the third vector.

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50. The computer readable medium of claim 48, wherein aligning the antenna to receive the second signal comprises receiving the second signal with a second LNB after reflection of the second signal from the antenna, wherein the first and second LNB's are relatively disposed such that the antenna is able to simultaneously receive the first and second signals via the first and second LNB's, respectively.

51. The computer readable medium of claim 50, wherein aligning the antenna to receive the first signal comprises pivoting the antenna about the elevation and azimuth axes to obtain the first vector, wherein aligning the antenna to receive the second signal comprises pivoting the antenna exclusively about the skew axis to simultaneously obtain the second vector and dispose the antenna at the skew angle.

52. The computer readable medium of claim 47, wherein aligning the antenna to receive the first signal comprises receiving location and orientation data from a sensor array coupled to the antenna and utilizing the location and orientation data to obtain a first window, within which the first vector is disposed, and wherein aligning the antenna to receive the second signal comprises utilizing the location and orientation data to obtain a second window, within which the second vector is disposed.

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53. The computer readable medium of claim 52, wherein aligning the antenna to receive the first signal comprises moving the antenna to receive the first signal from within the first window, and receiving signal strength data from within the first window to find a vector within the first window along which signal strength is maximized, thereby determining the first vector, wherein aligning the antenna to receive the second signal comprises moving the antenna to receive the second signal from within the second window and receiving signal strength data from within the second window to find a vector within the second window along which signal strength is maximized, thereby determining the second vector.

54. The computer readable medium of claim 47, wherein the first transmitter comprises a first satellite comprising a first dish and the second transmitter comprises a second satellite comprising a second dish, wherein aligning the antenna to receive the first signal comprises orienting the antenna substantially parallel to the first dish to enable communication of the antenna with the first satellite, wherein aligning the antenna to receive the second signal comprises orienting the antenna substantially parallel to the second dish to enable communication of the antenna with the second satellite.

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